Amendments to the Claims

Claims 1-59 (cancelled)

60. (original) A method of forming a coated article, the coated article comprising a substrate and a barrier layer disposed thereon, wherein the barrier layer is resistant to transmission of moisture and oxygen therethrough and has a water vapor transmission rate (WVTR) at 25°C and 100% relative humidity of less than about 2 g/m^2-day and an oxygen transmission rate (OTR) at 25°C and 100% oxygen concentration of less than about 2 cc/m^2-day, the method comprising the steps of:

a) providing a substrate;

b) generating an thermal plasma, the thermal plasma having an electron temperature of less than about 1eV;

c) injecting at least one reagent into the thermal plasma;

d) reacting the at least one reagent in the thermal plasma to form at least one deposition precursor;

e) depositing the at least one deposition precursor on the substrate at a rate of at least about 200 nm/min to form the barrier layer on the substrate.

61. (original) The method of Claim 60, wherein the step of depositing the at least one deposition precursor on the substrate at a rate of at least about 200 nm/min to form a barrier layer on the substrate comprises depositing the at least one deposition precursor on the substrate at a rate of at least about 200 nm/min to form a barrier layer comprising at least one of a metal oxide, a metal nitride, a metal carbide, and combinations thereof on the substrate.

62. (original) The method of Claim 61, wherein each of the metal nitride, the metal carbide, and the metal oxide contains at least one of silicon, aluminum, zinc, indium, tin, a transition metal, and combinations thereof.

63. (original) The method of Claim 61, wherein the transition metal is titanium.

64. (original) The method of Claim 60, wherein the article is one of a light emitting diode (LED), a liquid crystal display (LCD), a photovoltaic article, a flat panel display device, an electrochromic article, an organic integrated circuit, and an organic electroluminescent device (OELD).

65. (original) The method of Claim 60, wherein the step of providing a substrate comprises providing one of a glass substrate, a polymeric substrate, a silicon substrate, a metallic web substrate, and a fiberglass substrate.

66. (original) The method of Claim 65, wherein the polymeric substrate comprises one of a polycarbonate, a polyethylene terephtalene, a polyethylene naphthalene, a polyimide, a polyethersulfone, a polyacrylate, a polynorbornene, and combinations thereof.

67. (original) The method of Claim 65, wherein the metallic web comprises one of aluminum and steel.

68. (original) The method of Claim 60, wherein the step of generating a thermal plasma comprises generating an expanding thermal plasma.

69. (original) The method of Claim 60, wherein the step of injecting at least one reagent into the thermal plasma comprises injecting a first reagent into the thermal plasma, the first reagent comprising at least one of a silane, a metal vapor, a metal halide, and an organic compound of a

metal, wherein the metal is one of titanium, zinc, aluminum, indium, and tin, and combinations thereof.

70. (original) The method of Claim 69, wherein the silane is one of a disilane, an aminosilane, and a chlorosilane.

71. (original) The method of Claim 69, wherein the organic compound is one of titanium isopropoxide, diethyl zinc, dimethyl zinc, indium isopropoxide, indium tert-butoxide, aluminum isopropoxide, and combinations thereof.

72. (original) The method of Claim 69, wherein the metal halide is a metal chloride.

73. (original) The method of Claim 69, further comprising the step of injecting a second reagent into the plasma, the second reagent comprising at least one of oxygen, nitrogen, hydrogen, water, and ammonia.

74. (original) The method of Claim 60, further comprising the step of depositing at least one layer on one of the barrier layer and the substrate.

75. (original) The method of Claim 74, wherein the step of depositing at least one layer on one of the barrier layer and the substrate comprises depositing at least one layer of an organic material on one of the barrier layer and the substrate, the organic material comprising at least one of polymerized monomers, polymerized oligomers, a polymer, an epoxide, an acrylate, an acrylonitrile, a xylene, a styrene; and combinations thereof.

76. (original) The method of Claim 74, wherein the step of depositing at least one layer on one of the barrier layer and the substrate comprises depositing at least one layer of an inorganic material on one of the barrier layer and the substrate, the inorganic material comprising at least one of: a carbide of a metal, an oxycarbide of said metal, an oxide of said metal, a

nitride of said metal, wherein said metal is one of silicon, aluminum, titanium, zirconium, hafnium, tantalum, gallium, germanium, zinc, tin, cadmium, tungsten, molybdenum, chromium, vanadium, and platinum; amorphous carbon; a ceramic material, wherein said ceramic material comprises at least one of glass, silica, alumina, zirconia, boron nitride, boron carbide, and boron carbonitride.

77. (original) The method of Claim 74, wherein the step of depositing at least one layer on one of the barrier layer and the substrate comprises depositing at least one layer of an hybrid organic-inorganic material on one of the barrier layer and the substrate, the hybrid organic-inorganic material comprising at least one of a silicone, a siloxane, and an organic-inorganic polymer.

78. (original) The method of Claim 60, wherein the step of depositing the at least one deposition precursor on the substrate at a rate of at least about 200 nm/min to form the barrier layer on the substrate comprises depositing the at least one deposition precursor on the substrate at a rate of at least about 600 nm/min to form the barrier layer on the substrate.

79. (original) The method of Claim 78, wherein the step of depositing the at least one deposition precursor on the substrate at a rate of at least about 600 nm/min to form the barrier layer on the substrate comprises depositing the at least one deposition precursor on the substrate at a rate of at least about 3,000 nm/min to form the barrier layer on the substrate.

80. (original) The method of Claim 60, wherein the step of depositing the at least one deposition precursor on the substrate at a rate of at least about 3,000 nm/min to form the barrier layer on the substrate comprises depositing the at least one deposition precursor on the substrate at a rate of at least about 10,000 nm/min to form the barrier layer on the substrate.

81. (original) A method of forming a barrier layer on a substrate, wherein the barrier layer is resistant to transmission of moisture and oxygen therethrough and has a water vapor transmission rate (WVTR) at 25°C and 100% relative humidity of less than about 2 g/m^2-day and an oxygen transmission rate (OTR) at 25°C and 100% oxygen concentration of less than about 2 cc/m^2-day, and wherein the barrier layer comprises at least one of a metal oxide, a metal nitride, a metal carbide, and combinations thereof, wherein each of the metal nitride, the metal carbide, and the metal oxide contains at least one of silicon, aluminum, zinc, indium, tin, a transition metal, and combinations thereof, the method comprising the steps of:

a) generating a thermal plasma, the thermal plasma having an electron temperature of less than about 1eV;

b) injecting a first reagent into the thermal plasma, the first reagent comprising at least one of silicon, aluminum, zinc, indium, tin, a transition metal, and combinations thereof;

c) injecting a second reagent into the thermal plasma, the second reagent comprising at least one of oxygen, nitrogen, and ammonia;

d) reacting the first reagent and the second reagent in the thermal plasma to form at least one deposition precursor; and

e) depositing the at least one deposition precursor on the substrate at a rate of at least about 200 nm/min, thereby forming the barrier layer comprising at least one of a metal oxide, a metal nitride, a metal carbide, and combinations thereof on the substrate.

82. (original) The method according to Claim 81, wherein the step of generating a thermal plasma comprises generating an expanding thermal plasma.

83. (original) The method according to Claim 81, wherein the step of depositing the at least one deposition precursor on the substrate at a rate of at least about 200 nm/min comprises depositing the at least one deposition precursor on the substrate at a rate of at least about 600 nm/min.

84. (original) The method according to Claim 83, wherein the step of depositing the at least one deposition precursor on the substrate at a rate of at least about 600 nm/min comprises depositing the at least one deposition precursor on the substrate at a rate of at least about 3,000 nm/min.

85. (original) The method according to Claim 84, wherein the step of depositing the at least one deposition precursor at a rate of at least about 3,000 nm/min to form the barrier layer on the substrate comprises depositing the at least one deposition precursor at a rate of at least about 10,000 nm/ min on the substrate.

86. (original) A method of forming a coated article, the coated article comprising a substrate and a barrier layer disposed thereon, wherein the barrier layer has a water vapor transmission rate (WVTR) at 25°C and 100% relative humidity of less than about 2 g/m^2-day and an oxygen transmission rate (OTR) at 25°C and 100% oxygen concentration of less than about 2 cc/m^2-day, and wherein the barrier layer comprises at least one of at least one of a metal oxide, a metal nitride, a metal carbide, and combinations thereof, wherein each of the metal nitride, the metal carbide, and the metal oxide contains at least one of silicon, aluminum, zinc, indium, tin, a transition metal, and combinations thereof, the method comprising the steps of:

a) providing a substrate;

b) generating a thermal plasma, the thermal plasma having an electron temperature of less than about 1eV;

c) injecting a first reagent into the thermal plasma, the first reagent comprising at least one of silicon, aluminum, zinc, indium, tin, a transition metal, and combinations thereof;

d) injecting a second reagent into the thermal plasma, the second reagent comprising at least one of oxygen, nitrogen, water, and ammonia;

e) reacting the first reagent and the second reagent in the thermal plasma to form at least one deposition precursor; and

f) depositing the at least one deposition precursor on the substrate at a rate of at least about 200 nm/min, thereby forming the barrier layer comprising at least one of a metal oxide, a metal nitride, a metal carbide, and combinations thereof on the substrate.

87. (original) The method of Claim 86, wherein the transition metal is titanium.

88. (original) The method of Claim 86, wherein the article is one of a light emitting diode (LED), a liquid crystal display (LCD), a photovoltaic article, a flat panel display device, an electrochromic article, and an organic electroluminescent device (OELD).

89. (original) The method of Claim 86, wherein the step of providing a substrate comprises providing one of a glass substrate, a polymeric substrate, a silicon substrate, a metallic web substrate, and a fiberglass substrate.

90. (original) The method of Claim 86, wherein the polymeric substrate comprises one of a polycarbonate, a polyethylene terephtalene, a polyethylene naphthalene, a polyimide, a polyethersulfone, a polyacrylate, a polynorbornene, and combinations thereof.

91. (original) The method of Claim 86, wherein the metallic web comprises one of aluminum and steel.

92. (original) The method of Claim 86, wherein the step of generating a thermal plasma comprises generating an expanding thermal plasma.

93. (original) The method of Claim 86, wherein the step of injecting at least one reagent into the thermal plasma comprises injecting a first reagent into the thermal plasma, the first reagent comprising at least one of a silane, a metal vapor, a metal halide, and an organic compound of a metal, wherein the metal is one of titanium, zinc, aluminum, indium, tin, and combinations thereof.

94. (original) The method of Claim 93, wherein the silane is one of a disilane, an aminosilane, and a chlorosilane.

95. (original) The method of Claim 93, wherein the organic compound one of titanium isopropoxide, diethyl zinc, dimethyl zinc, indium isopropoxide, indium tert-butoxide, aluminum isopropoxide, and combinations thereof.

96. (original) The method of Claim 93, wherein the metal halide is a metal chloride.

97. (original) The method of Claim 86, wherein the second reagent comprises at least one of oxygen, nitrogen, hydrogen, water, and ammonia.

98. (original) The method of Claim 86, further comprising the step of depositing at least one layer on one of the barrier layer and the substrate.

99. (original) The method of Claim 86, wherein the step of depositing at least one layer on one of the barrier layer and the substrate comprises depositing at least one layer of an organic material on one of the barrier layer and the substrate, the organic material comprising at least one of

polymerized monomers, polymerized oligomers, a polymer, an epoxide, an acrylate, an acrylonitrile, a xylene, a styrene, and combinations thereof.

100. (original) The method of Claim 86, wherein the step of depositing at least one layer on one of the barrier layer and the substrate comprises depositing at least one layer of an inorganic material on one of the barrier layer and the substrate, the inorganic material comprising at least one of: a carbide of a metal, an oxycarbide of the metal, an oxide of the metal, and a nitride of the metal, wherein the metal is one of silicon, aluminum, titanium, zirconium, hafnium, tantalum, gallium, germanium, zinc, tin, cadmium, tungsten, molybdenum, chromium, vanadium, and platinum; amorphous carbon; a ceramic material, wherein the ceramic material comprises at least one of glass, silica, alumina, zirconia, boron nitride, boron carbide, and boron carbonitride.

101. (original) The method of Claim 86, wherein the step of depositing the at least one deposition precursor on the substrate at a rate of at least about 200 nm/min comprises depositing the at least deposition precursor on the substrate at a rate of at least about 600 nm/min.

102. (original) The method of Claim 101, wherein the step of depositing the at least one deposition precursor on the substrate at a rate of at least about 600 nm/min comprises depositing the at least one deposition precursor on the substrate at a rate of at least about 3,000 nm/min.

103. (original) The method of Claim 102, wherein the step of depositing the at least one deposition precursor on the substrate at a rate of at least about 3,000 nm/min comprises depositing the at least one deposition precursor on the substrate at a rate of at least about 10,000 nm/min.